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PUBLISHED WEEKLY BY ADAM WALDIE.

46 *CARPENTER STREET, REAR OF THE ARCADE, PHILADELPHIA.*

The Journal of Belles Lettres.

PENNSYLVANIA HORTICULTURAL EXHIBITION.

It affords us much satisfaction to have had the Journal selected as the vehicle of *first* publishing the *first* report *in extenso* of any of the exhibitions given by the Pennsylvania Horticultural Society. This delightful and humanising study has been of late years rapidly advancing in the estimation and *affections* of the public. This has been fully evinced by the increased interest exhibited at each successive exhibition in Philadelphia, but more particularly by the extensive and splendid private collections in the city, cultivated entirely *con amore*. They are unrivaled, we presume, by those of any other city in the Union, and to them we may safely refer the comparative improving taste of the ladies. A love of flowers is almost always the concomitant of a well cultivated mind among females; and this acknowledged, the crowded state of the rooms during the exhibition showed how high the Philadelphia ladies should be placed. The exhibition was indeed a lovely scene—the beauty of animate and inanimate nature—the *poetry* of creation—was seen in all its perfection.

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The tenth exhibition of the Pennsylvania Horticultural Society was held at the Masonic Hall, on the 20th, 21st, and 22d of September, 1837, and great merit is due to the committee of arrangement for the splendour with which it was got up.

On entering the saloon, a large oval table was placed before you, filled with the choicest exotics from the tropics to the arctic circle. In the centre stood one of the beautiful palms of Ceylon, the Latania borbonica. A Cypripodium insigne (a ladies' slipper) from India, excited much curiosity from the extreme resemblance of its flower to wax. It is believed to be the first introduced into this country; (there is another, the *venustum*, from India, but the greater part of this beautiful family are indigenous.) On the east and west of the centre table were circular ones, each crowned by a beautiful screw pine, the Pandanus utilis, and the Pandanus spiralis, surrounded by a vast variety of that beautiful flower, the dahlia, of every tint and hue. At the east end of the saloon was a semicircular table, on which was a large plant of the Astrapœa Wallichii, surrounded by beautiful exotics; at the west end was a corresponding table, with another palm, the Latania borbonica, and near it a very large plant of the Crinum amabile, in full flower, one of the Lilaceous family; also the black and green teas, the black pepper, the camphor and cinnamon trees, with many of the choicest plants. The walls of the saloon were lined with tables, spread with beautiful plants. In one of the recesses was observed a most singular submarine production, from Singapore; it drew universal attention from its great size and appearance; it has received the appropriate appellation of *Neptune's wine-cup*; and near this was a frame-work, having the silk-worm in its various stages, from the recently produced worm to the finished cocoon. In the window recesses were displayed an immense number of dahlias. Near one of the east windows was a pyramid ten feet high, by A. Dryburgh, covered with various kinds of flowers, interspersed with evergreens. At one of the north windows was a beautiful architectural model of the United States Bank, by R. Buist, covered with a great variety of the finest flowers, and on the architrave stood inscribed in high relief "*The Bank;*" the columns were covered with the petals of crimson dahlias, and the whole was one of the most beautiful fairy productions imaginable. On the opposite side there was an imitation of a tree ten feet high, by D. Maupay, covered with upwards of 4000 flowers of dahlias. On the ends of the branches were perched stuffed birds, of great beauty, and on the top a dozen of the finest plumage apparently in the act of perching, which had a fine effect. These artificial productions gave relief to the green shrubbery, and had a most pleasing appearance. Over the door of the north or banqueting room was a star of the first magnitude, by S. Reeve, of New Jersey, and was composed of dahlias and evergreens. Immediately within the room arose a triangular column sixteen feet high, constructed by the same hand, covered with dahlia flowers. Through the centre of this room ran a stage having three elevations of one foot each; on the first two were displayed a splendid variety of the choicest fruits of the season, tastefully arranged in glass dishes. The top was crowned with fine grapes in pots. This stage was flanked by flowers, plants in pots, and vegetables of the best kinds. Over the door at the north end was an imitation of the American eagle, composed of various kinds of flowers to suit the plumage, the eye beautifully represented by a flower of the Rudbeckia hirta, strongly characteristic of the daring bird; the whole did Mr. Sherwood, the maker, great credit. On entering the room, notwithstanding the delicious fruits presented, the eye was suddenly arrested by two enormous pumpkins, one raised by Mr. John Wetherill, of Chalkley Hall, near Frankford, measuring in girth eight feet six inches, weighing 238 lbs.; the other by Thornton Comfort, of Byberry, measuring in girth seven feet, weighing 188 lbs.; they elicited great surprise. On one of the side tables was the Nepenthes destillatoria, or pitcher plant, from the East Indies, and the first exhibited in this country, being raised from seed by Mr. Buist; on the end of each leaf is a pitcher with a lid, which is elevated and depressed by circumstances; it is certainly one of the strange productions of nature, and excited much curiosity. Many of the exotics in this room were rare and beautiful; a very large Crinum amabile in bloom, from the garden of George Pepper, Esq., was justly admired.

The rooms when viewed from any point, presented a beautiful perspective, and it must have been highly gratifying to the committee of arrangement to have heard encomiums every where passed on them by the immense numbers who visited the hall, where the beauty wealth, and intelligence of Philadelphia were largely represented.

Some only of the finest and rarest plants exhibited are here enumerated.

Plants contributed by J. B. Smith, Christian street.

Astrapœa Wallichii, do. mollis, do. viscosa; Ardisia litoralis, Adansonia digitata, Araucaria imbricaria, Anona tripetala, do. muricata, do. squamosa, do. palustris; Areca montana, do. oleracea, Acrocomia aculeata, Banksia grandis, do. verticillata, do. ericoides, do. pulchella, o. Cunninghami; Beaufortia decussata, Beaumontia grandiflora, Bonapartea juncea, Brexia serratifolia, do. integrifolia: Cameraria latifolia, Carissa spinarum, Cayota urens, Catesbœa spinosa, Cedrela odorata, Cerbera thevitia, Cicca racemosa, Carolinea princeps, Coccoloba uvifera, Cacos nucifera, Combretum purpureum, Corypha speciosa, Cunonia capensis, Cycas circinalis, Dillenia speciosa, Dracœna ferrea, do. terminalis, do. Brasiliensis, do. reflexa, do. marginata, do. australis, do. draco; Hura crepitans, Jacaranda filicifolia, Jacquinia, Jatropha multifida, do. curcas, do. manihot; Latania borbonica, Laurus camphora, Lawsonia enermis, Levistonia mauritania, Limonia trifoliata, do. pentaphylla; Myrtus pimento, do. acris; Pandanus utilis, do. spiralis; Parkinsonia aculeata, Phœnix dactylifera, do. reclinata; Poinciana pulcherrima, Pothos crassinervia, Rhaphis flabelliformis, Sabal Adansoni, Sweitenia mahagoni, Tamarindus indica, Taxus nucifera, Thrina parviflora, do. elegans; Terminalia catappa, Xylophylla longifolia, Yucca, fol. varieg., Zamia horrida, do. pungens, do. integrifolia; Polypodium aureum, Bixa orellana.

Plants exhibited by George Pepper.

Dracœna purpurea, do. terminalis; Zamia horrida, Bixa orellana, Eugenia australis, Musa sapientum, Benzoin terminalis, Areca oleracea, Levistonia mauritania, Rhapis flabelliformis, Crinum amabile, Phœnix dactylifera, Cycas revoluta, Pitcairnia aculata, Saccharum officinarum, Manettia cordifolia, Tillandsia bromeliefolia.

Plants by R. Buist.

Cypripedium insigne, Nepenthes destillatoria, Euonymus japonicus, fol. var., Gardoquia Hookerii, Manettia cordifolia, Witsenia corrymbosa, Lechenaultia formosa, Crinum amabile, Cereus splendens, Russelia juncea, Banksia Cunninghami, Torenia scabra, Erica Margaritacea, Brunfelsia Americana, Scottia dentata, Passiflora Kermisina, Boronica serrulata, Geaneria Douglasii, do. rupestris; Thunbergia fragrans, Epacris impressa, do. heteronema, Hovea pannosa, Garrya elliptica, Verbena Tweediana, Ipomea Horsfalli.

By T. Landreth.

Bonapartia juncea, Rochea falcata, Ficus elastica, Laurus cinnamomum, Magnolia fuscata, Pandanus odoratissimus, Ficus nitida, Thea viridis, Banksia microphylla, do. Cunninghami; Illicum anisatum, Citrus variegata, Correa speciosa, Coffea arabica, Ficus costata, Diosma fragrans, Justicia picta, Agapanthus variegata, Laurus camphora, Coccoloba uvifera, Tabernæmontana coronaria, Tarchonanthus camphoratus.

By John M'Arran.

Agave Americana varieg., Cycas revoluta, Olea Europea, Mimosa farnesiana, Melianthus major, Eugenia jambos, Arum esculentum, Phormium tenax, Ruellia salicifolia, Zingiber officinale, Piper nigrum, Saccharum officinarum, Coffea arabica, Ardisia solanacea, Ilex variegata, Erica vulgarus, do. Mediterranea; Fuchsia of different kinds, Mespilus japonica, Taxus Chinensis, Coffea Bengalensis, Thea bohea, do. viridis; Ficus elastica, Nerium splendens, Olea fragrans, Melaleucas of different kinds, and a variety of roses.

By Colonel R. Carr.

Laurus camphora, Quassia amara, Musa rosacea, Piper nigrum, Ceratonia siliqua, Ficus elastica, Coffea arabica,

Phœnix dactylifera, Cycas revoluta, Cactus of various kinds, Sapindus saponaria, Tabernæmontana coronaria, Terminalia benzoin, Thunbergia coccinea, do. grandiflora, Limonium trifoliatum, Zamia pungens, Tecoma australis, Ginkgo biloba, Pothos laceulata, Pistacia lentiscus, Cookia punctata.

By J. Sherwood.

Tillandsia amœna, do. ligulata, do. bromeliæfolia; Erica cerinthoides, do. urceolaris, do. ardens, do. calycina, do. andromedæflora, do. savileana, do. ventricosa, do. verticillata, do. pubescens major; Daphne Cneorum, do. napolitana, do. oleæfolia, do. Dauphinii, do. collina, do. alpina; Saxifraga ligulata, Menettia cordifolia, Russelia juncea, Eriocoma fragrans, Cotoneaster microphylla, do. affinis; Astrapœa Wallichii, Cactus Boydsia, do. murantina, do. conspicua, do. Napierii, do. vandisia, do. macrodixa; Yucca fol. variegata, yellow and white rhododendrons, Cerbera thevitia, Dillwynia cinerascens, do. Sutherlandia frutescens; Boronia dentata, Callistachys ovata, Menziesia polifolia, do. rubra, do. alba; Gesneria bulbosa, Alstrœmeria aurantiaca, Arum crinitum, do. trilobatum; Berberis dulcis, Nuttalia papaver, Doryanthes excelsa, Lechenaultia formosa.

By Alexander Parker.

Adiantum trapeziforme, Agave Americana, do. variegata; Albuca altissima, Aloe arborescens, do. maculata, do. saponaria, do. longifolia, do. discolor; Asplenium elatum, Artemisia dentata, Arum cordifolium, Begonia argyrostigma, do. macrophylla; Cactus many varieties and species, Chamærops hystrix, Cestrum Parqui, Ceratonia siliqua, Diosma ericifolia, Edwardsia microphylla, Furcræa gigantea, Glariania? grandiflora, Illicium floridanum, Maurandia Barclayana, Olea Europea, Portulaca arborea, Paliurus aculeatus, Pistacia Terebinthus, Plectranthus fruticosus, Pomaderris apetala, Rivina humilis.

By Andrew Dryburgh.

Bonapartea juncea, Correa speciosa, Blæria ericoides, Dracœna terminalis, Erythrina crista galli, Euphorbia splendens, Ficus elastica, Chironia grandiflora, Hæmanthus puboscens, Ixora coccinea, Leucodendron argentea, Menziesia alba, Pittisporum viridiflorum, Thea bohea, do. viridis; Tillandsia amœna, Roella ciliata, Viburnum tomentosa, Ericas of various sorts, Proteas of different kinds, and a variety of roses.

The plants enumerated above are many of them fine and very rare, and are not to be found in many private establishments in Europe. Those of J. B. Smith's are mostly tropical plants, requiring great judgment and care to cultivate them, and by their fine healthy condition establishing the skill and science of their proprietor.

Mr. Pepper is one of the oldest amateurs in the country, and his good taste is evinced in his selection of plants, and exertions in procuring rare exotics.

Mr. Buist's garden in Twelfth street, near Lombard street, is well known for its neatness and the excellency of its plants. Mr. Buist has introduced some of the rarest and most interesting; his collection of those from the Cape and New Holland equals any in the country; his dahlias are of the most select kinds and of great variety, and he has raised a few seedlings which surpass any that have come from England.

Colonel Robert Carr is the present proprietor of Bartram's botanic garden, the oldest in the country; his plants are good and of various celebrated kinds, his establishment being better known in Europe than any other, from the great quantity of native seeds he exports.

The garden and nurseries of Mr. Thomas Landreth, on Federal street, (late D. & C. Landreth,) are well known as of the oldest in the United States. His collection of plants and trees may be ranked among the most select; the seed department of this ancient concern, so justly celebrated for the freshness and purity of its products, is now conducted by D. Landreth & Co. Seed grounds are on Fifth street below Federal. Warehouse, 63 Chesnut street.

Mr. John M'Arran's garden, west Market street, is well known; his collection is good, both from the age and great growth of his plants; his Cycas revoluta, or Sago palm, is upwards of a hundred years old, being the plant formerly in the possession of the late Wm. Hamilton, Esq., of the Woodlands. Mr. M'A. has the merit of establishing the first public garden in Philadelphia; his green-house in winter refreshes the visiter by its contrast to the dreariness without.

Mr. Parker's establishment in Prime street is well known from its neatness and good collection of plants; he deserves great credit, being one of those self-taught men who had to encounter great difficulties in the pursuit of knowledge; his perseverance has been rewarded by the attainment of scientific skill, and by the acquisition of a large collection of plants and shrubs.

Mr. John Sherwood's establishment at Laurel Hill is one lately commenced, and from the fine specimens of plants exhibited, bids fair to do well; many of his plants are rare and well worthy a place in any collection.

Mr. A. Dryburgh, Race street, by Schuylkill Fourth street, has many fine plants, especially those of New Holland. His roses and dahlias are numerous and of the choicest kinds.

Mr. Duke, the proprietor of the garden formerly Mr. M'Mahon's, contributed many fine plants. Mr. D'Arras, near the Rising Sun, also furnished some beautiful exotics. D. Maupay, and D. M'Avoy, at the Rising Sun, Germantown road, and Robert Kilvington, gardener to Wm. Lloyd, contributed largely from their gardens in fine bouquets. Mrs. Hibbert, Thirteenth street, near South, whose establishment is well known to the ladies, has many fine plants, with a good collection of dahlias.

Mr. Heiskel, near Bristol, Messrs. A. S. Roberts, and S. Cohen, of this city, deserve thanks for furnishing plants. Mr. C.'s figs were fine and large, the trees healthy; it being the second crop this season. The society was much indebted to its fair friends for their imitations of flowers in wax and shells; Miss Gorges' shell-work exceeding any thing ever exhibited, and does her the greatest honour to taste and perseverance. The wax-work by Mrs. Shiba, Mrs. Ash, and S. W. Horn, was beyond all praise.

FRUIT.

The fruits in general were very good, much better than might have been expected, considering the unpropitious season for the finer kinds, such as grapes, peaches, and the melon family; the grapes exhibited by Mr. Beehler and Mr. Laws were of the best quality and perfectly ripe; these gentlemen deserve the greatest praise for their care in bringing the fruit to such perfection, and is another evidence of what can be done in the city in cultivating the grape; indeed the whole exhibited were excellent, and the growers merit high approbation.

Grapes, exhibited by Dr. J. T. Sharpless, were the white Frontignac, the green and yellow Provence, and Chasselas of Fontainbleau. Malaga, by Tobias Beehler, Marshal street, were the finest of the kind exhibited. By James Laws, the Fandanvert and Hanstretto were very fine, more especially when we consider the season, being grown in the garden. By J. H. Seal, the Golden Chasselas; the Alexandria by H. Ballinger, John Sergeant, Esq., Alexander Parker, and A. Peters; the Isabella by Alexander Parker and J. H. Seal; the Hampton Court by George Laws, Wm. S. Hansel, P. Penn Gaskill, Peter Robbins, and Jos. S. Madeiry; the Powel by J. Sergeant, Esq.; the Bland by ditto; the Catawba by Mr. Heisser; the Elsinboro' by David Allan and A. Quicksale, Burlington, N. J.; the Golden Chasselas, ditto; the Miller by J. Griffiths. All the above were raised without cover.

Those by Nicholas Biddle, Esq., and Mr. Camac, were as fine as could be produced, more particularly so when we consider that the vines are only two years old, and growing in pots. Mr. B. has erected a very extensive grapery, and in a year or two will be able to supply the market with thousands of pounds of that luscious fruit. He who introduces any scientific discovery, mechanical invention, or useful improvement for the benefit of mankind, deserves far higher praise than the blood-stained hero who figures in the page of history. Mr. Camac has caught the enthusiasm, and is building a large grapery; the public is indebted much to such men for their liberality, as they never can be remunerated for their expense.

The pears were excellent and large, giving ample proof what can be done if only care and a little more labour were bestowed by our farmers in their cultivation. The melons by Messrs. Jos. J. and Geo. J. Hatch, of N. J. and Jos. E. Scott, of Burlington, N. J., were very superior in size and flavour, and the Messrs. H. are entitled to all praise for the uniform excellence of their yearly display. Nutmeg melons by Mr. Riley, gardener to Pierce Butler, Esq., were very large.

Apples, by H. Hatch, Mr. Ralston, A. Lippincott, N. J., A. D'Arras, Horace Binney, Esq.; the Pound Pippins of J. Busby, N. J., were very large.

Quinces, by Jacob Copia. *Plums*, by A Parker.

Peaches, extra fine, from Mr. B. Bullock's garden, North Third street, Joseph E. Scott, Burlington, N. J., Mr. Alberger, Horace Binney, Esq., Reeves & Ridgeway (Delaware), John Sergeant, Esq., and J. B. Smith.

Seckel Pears, from H. Binney, Esq., Samuel P. Wetherill, Burlington, N. J., A. D'Arras, and Mrs. Hibbert.

Butter Pears, by H. Ballinger, Anthony Felton, and A. Parker.

Doyonné Pear, by J. B. Smith, Esq.

VEGETABLES.

The vegetables generally merited the highest approbation, more especially those exhibited by Mr. Anthony Felton, showing the great care, perseverance, industry, besides great expense before they could be brought to such perfection; never was there a finer display of vegetables.

Egg-plants, by Edwin A. Stevens, Bordentown, Thomas Hancock, Burlington, N. J., the above were very large; R. Ralston, of Mount Peace, Anthony Felton, Wm. Camac, Esq., and Thomas Heiskel.

Cabbage, by D. Maupay; Wm. Norris, Turner's lane, Jacob Amor, N. J., and Anthony Felton. *Mangel wurtz* by J. C. Jones and Casper W. Morris, Magnolia farm. *Sugar beet* by Pierce Butler and P. C. Wetherill. *Beets* by Wm. Norris, Turner's lane, and A. Felton. Two very large ropes of very superior *Onions*, raised from seed by Mr. E. Kelly, gardener at the United States' Naval Asylum, under the superintendance of Captain James Cooper, and also very fine by J. Beadle, gardener to Mr. Norris. *Parsnips* by Thomas Snyder, very fine. Some fine *Peas* by Abigail Pool, near Burlington, N. J. The following were deposited by Anthony Felton, and were of the very best quality,—viz: chard, tomatoes of every variety, squashes, the Egyptian, the Maltese, the China, and the South Sea, brocoli, lettuce, Lima beans, carrots, parsnips, potatoes, celery, radishes of every kind, curled kale, peas, turnips, peppers of various kinds, and endive. There was some very superior celery by Francis Briell, N. J. Dahlias by Andrew Dryburgh, Robert Buist, Wm. B. Wood, S. Cooper, Horace Binney, Esq., J. B. Smith, Esq., T. Landreth, A. Parker, Mr. T. Heiskel, D. Maupay, Samuel Reeves, Salem, N. J., and some very choice kinds from George C. Thorburn, N. J.

Of the above numerous gardens in and around the city, we may well be proud, and the country is materially benefitted by the Pennsylvania Horticultural Society, in exciting such laudable emulation among our gardeners. The advantages possessed here are great, more so, perhaps, than in any other place of the Union, and we ought duly to improve them in cultivating horticulture in all its departments of beauty and usefulness.

Upon the whole the exhibition, in all respects, gave more general satisfaction than any of preceding years. The society has every reason to draw from its

tatives of the highest encouragement for the future.

Respectfully submitted.

G. Watson, *Recording Secretary.*

Philadelphia, October 17, 1837.

The committees in the different departments have awarded the premiums to the successful competitors at the tenth exhibition as follows:—

The committee on flowers award for the best twelve varieties of dahlias, a premium of three dollars to Robert Buist. For the best six varieties of dahlias, the premium of three dollars to Andrew Dryburgh. For the best American seedling parti-coloured dahlia, a premium of three dollars to Robert Buist. For the best American seedling self-coloured dahlia, a premium of three dollars to Robert Buist. A number of these were of the newest kinds lately imported from Europe, and were remarkable for their delicate tints and colours. Some fine kinds from the garden of George C. Thorburn, of New York, attracted the great attention of the numerous visiters, and for which the society return him their thanks.

The committee on fruits award for the best watermelon, the premium of five dollars to J. J. Hatch. For the best nutmeg melon, the premium of three dollars to Mr. Riley. For the best foreign grapes, the premium of three dollars to Tobias Beehler. For the best native grapes, the premium of three dollars to Isaac Meyer. For the best fall apples, the premium of three dollars to A. Lippincott, of New Jersey. For the best peaches, the premium of three dollars to Benjamin Bullock. For quinces no premium is awarded, as no contributor furnished the requisite quantity; a few of extra quality were presented by Jacob Copia. An honorary premium to Nicholas Biddle, for a great display of foreign grapes, raised under glass. A premium of three dollars to John Smith, gardener to N. Biddle, for grapes in pots, with a full crop, plants only two years old.

An honorary premium to James Laws, for his very great display of native and foreign grapes.

For the best seedling pear, to John B. Smith the premium of three dollars; the committee named it *Smith's Pennsylvania Pear;* it is of the *beurré* or butter variety, is of extra merit, being both well-flavoured and a great bearer. For the best pears, a premium of three dollars to J. B. Smith; this premium was overlooked in the prize list, but the committee deem it their duty to award it.

The committee on vegetables award for the best cabbage (drum head), the premium of three dollars, to Jacob Amer. For the best carrots, the premium of three dollars to Anthony Felton. For the best cabbage lettuce, the premium of three dollars to Anthony Felton. The committee also strongly recommend that an honorary premium of three dollars be awarded to each of the undernamed gentlemen (accompanied by a certificate), as a mark of distinction for their perseverance and skill in bringing to such great perfection the articles attached to their names below—viz.

To John Wetherill, of Chalkley Hall, for a pumpkin weighing 238 lbs., and 8½ feet in circumference. To John B. Smith, for four artichokes, extra fine. To Edwin A. Stevens, of Bordentown, N. J., for a number of cuttings, of two varieties, much superior to the ordinary quality. To E. Kelly, gardener to Captain James B. Cooper, of the Naval Asylum, for a quantity of uncommonly large and fine Lisbon onions, raised from the seed. It is worthy of remark, that the garden of the Naval Asylum is in its infancy and consequently cannot possess the advantages of those of longer standing, and that the onions were not produced in the ordinary way, from sets or small onions of the previous year, but from the seed.

BABBAGE'S NINTH BRIDGEWATER TREATISE.

CHAPTER II.

ARGUMENT IN FAVOUR OF DESIGN FROM THE CHANGING OF LAWS IN NATURAL EVENTS.

The estimate we form of the intellectual capacity of our race, is founded on an examination of those productions which have resulted from the loftiest flights of individual genius, or from the accumulated labours of generations of men, by whose long-continued exertions a body of science has been raised up, surpassing in its extent the creative powers of any individual, and demanding for its development a length of time, to which no single life extends.

The estimate we form of the Creator of the visible world rests ultimately on the same foundation. Conscious that we each of us employ, in our own productions, *means* intended to accomplish the objects at which we aim, and tracing throughout the actions and inventions of our fellow-creatures the same intention—judging also, of their capacity by the fit selection they make of the means by which they work, we are irresistibly led, when we contemplate the natural world, to attempt to trace each existing fact presented to our senses to some precontrived arrangement, itself perhaps the consequence of a yet more general law; and where the most powerful aids by which we can assist our limited faculties fail in enabling us to detect such connections, we still, and not the less, believe that a more extended enquiry, or higher powers, would enable us to discover them.

The larger the number of consequences resulting from any law, and the more they are foreseen, the greater the knowledge and intelligence we ascribe to the being by which it was ordained. In the earlier stages of our knowledge, we behold a multitude of distinct laws, all harmonising to produce results which we deem beneficial to our own species: as science advances, many of these minor laws merge into some more general principles; and with its higher progress these secondary principles appear, in their turn, the mere consequences of some still more general law. Such has been the case in two of the most curious and most elaborately cultivated branches of human knowledge, the sciences of astronomy and optics. All analogy leads us to infer, and new discoveries continually direct our expectation to the idea, that the most extensive laws to which we have hitherto attained, converge to some few simple and general principles, by which the whole of the material universe is sustained, and from which its infinitely varied phenomena emerge as the necessary consequences.

To illustrate the distinction between a system to which the restoring hand of its contriver is applied, either frequently or at distant intervals, and one which had received at its first formation the impress of the will of its author, foreseeing the varied, but yet necessary laws of its action, throughout the whole extent of its existence, we must have recourse to some machine, the produce of human skill. But far as all such engines must ever be placed at an immeasurable interval below the simplest of nature's works, yet, from the vastness of those cycles which even human contrivance in some cases unfolds to our view, we may perhaps be enabled to form a faint estimate of the magnitude of that lowest step in the chain of reasoning, which leads us up to nature's God.

The illustration which I shall here employ will be derived from the results afforded by the calculating engine; and this I am the more disposed to use, because my own views respecting the extent of the laws of nature were greatly enlarged by considering it, and also because it incidentally presents matter for reflection on the subject of inductive reasoning. Nor will any difficulty arise from the complexity of that engine; no knowledge of its mechanism, nor any acquaintance with mathematical science, being necessary for comprehending the illustration, it being sufficient merely to conceive that computations of great complexity can be effected by mechanical means.

Let the reader imagine that such an engine has been adjusted; and that it is moved by a weight; and that he sits down before it, and observes a wheel, which revolves through a small angle round its axis, at short intervals, presenting to his eyes, successively, a series of numbers engraved on its divided circumference.

Let the figures thus seen be the series 1, 2, 3, 4, 5, &c., of natural numbers, each of which exceeds its immediate antecedent by unity.

Now, reader, let me ask how long you will have counted before you are firmly convinced that the engine has been so adjusted that it will continue, whilst its motion is maintained, to produce the same series of natural numbers? Some minds are so constituted, that after passing the first hundred terms, they will be satisfied that they are acquainted with the law. After seeing five hundred terms, few will doubt; and after the fifty-thousandth term, the propensity to believe that the succeeding term will be fifty thousand and one, will be almost irresistible. That term *will* be fifty thousand and one; and the same regular succession will continue; the five-millionth and the fifty-millionth term will still appear in their expected order; and one unbroken chain of natural numbers will pass before your eyes, from *one* up to *one hundred million.*

True to the vast induction which has been made, the next succeeding term will be one hundred million and one; but the next number presented by the rim of the wheel, instead of being one hundred million and two, is one hundred million *ten thousand* and two. The whole series from the commencement being thus:—

1
2
3
4
5
. . .
. . .
. . . . .
. . . . .
99,999,999
100,000,000
regularly as far as 100,000,001
100,010,002 the law changes.
100,030,003
100,060,004
100,100,005
100,150,006
100,210,007
100,280,008
... ...
... ...

"The law which *seemed* at first to govern this series fails at the hundred million and second term. This term is larger than we expected, by 10,000. The next term is larger than was anticipated, by 30,000, and the excess of each term above what we had expected forms the following table:—

10,000
30,000
60,000
100,000
150,000
::: :::

being, in fact, the series of *triangular numbers,** each multiplied by 10,000.

If we now continue to observe the numbers presented by the wheel, we shall find, that for a hundred, or even for a thousand terms, they continue to follow the new law relating to the triangular numbers; but after watching them for 2761 terms, we find that this law fails in the case of the 2762d term.

If we continue to observe, we shall discover another law then coming into action, which also is dependent, but in a different manner, on triangular numbers. This will continue through about 1430 terms, when a new law is again introduced, which extends over about 950 terms; and this, too, like all its predecessors, fails, and gives place to other laws, which appear at different intervals.

Now, it must be remarked, that the law *that each number presented by the engine is greater by unity than the preceding number,* which law the observer had deduced from *an induction of a hundred million instances,* was not the true law that regulated its action; and that the occurrence of the number 100,010,002 at the 100,000,002d term, was *as necessary a consequence* of the original adjustment, and might have been as fully foreknown at the commencement, as was the regular succession of any one of the intermediate numbers to its immediate antecedent. The same remark applies to the

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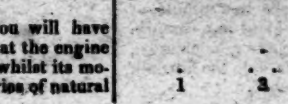
* The numbers 1, 3, 6, 10, 15, 21, 28, &c., are formed by adding the successive terms of the series of natural numbers thus:

$$1 = 1.$$
$$1 + 2 = 3.$$
$$1 + 2 + 3 = 6.$$
$$1 + 2 + 3 + 4 = 10, \text{ &c.}$$

They are called triangular numbers, because a number of points, corresponding to any term, can always be placed in the form of a triangle, for instance:—



next *apparent* deviation from the new law, which was founded on an induction of 2761 terms, and also to the succeeding law; with this limitation only—that whilst their consecutive introduction at various definite intervals is a necessary consequence of the mechanical structure of the engine, our knowledge of analysis does not enable us to predict the periods themselves at which the more distant laws will be introduced.

Such are the facts which, by a certain adjustment of the calculating engine, would be presented to the observer. Now, let him imagine another engine, offering to him precisely the same figures in the same order of succession; but let it be necessary for the maker of that other engine, previously to each apparent change in the law, to make some new adjustment in the structure of the engine itself, in order to accomplish the ends proposed. The first engine must be susceptible of having embodied in its mechanical structure that more general law of which all the observed laws were but isolated portions—a law so complicated, that analysis itself, in its present state, can scarcely grasp the whole question. The second engine might be of far simpler contrivance; it must be capable of receiving the laws impressed upon it from without, but is incapable, by its own intrinsic structure, of changing, at definite periods, and in unlimited succession, those laws by which it acts. Which of these two engines would, in the reader's opinion, give the higher proof of skill in the contriver? He cannot for a moment hesitate in pronouncing that that on which, after its original adjustment, no superintendence was required, displayed far greater ingenuity than that which demanded, at every change in its law, the intervention of its contriver.

The engine we have been considering is but a very small portion (about fifteen figures) of a much larger one, which was preparing, and partly executed; it was intended, when completed, that it should have presented at once to the eye about one hundred and thirty figures. In that more extended form which recent simplifications have enabled me to give to machinery constructed for the purpose of making calculations, it will be possible, by certain adjustments, to set the engine so that it shall produce the series of natural numbers in regular order, from unity up to a number expressed by more than a thousand places of figures. At the end of that term, another and a different law shall regulate the succeeding terms; this law shall continue in operation perhaps for a number of terms, expressed by unity, followed by a thousand zeros, or 10^{1000}; at which period another law shall be introduced, and, like its predecessors, govern the figures produced by the engine during a third of those enormous periods. This change of laws might continue without limit; each individual law destined to govern for millions of ages the calculations of the engine, and then give way to its successor to pursue a like career.*

Thus, a series of laws, each simple in itself, successively spring into existence, at distances almost too great for human conception. The full expression of that wider law, which comprehends within it this unlimited sequence of minor consequences, may indeed be beyond the utmost reach of mathematical analysis: but of one remarkable fact, however, we are certain—that the mechanism brought into action for the purpose of changing the nature of the calculation from the production of its more elementary operations into those highly complicated ones of which we speak, is itself of the simplest kind.

In contemplating the operations of laws so uniform during such immense periods, and then changing so completely their apparent nature, whilst the alterations are in fact only the necessary consequences of some far higher law, we can scarcely avoid remarking the analogy which they bear to several of the phenomena of nature.

The laws of animal life which regulate the caterpillar, seem totally distinct from those which, in the subsequent stage of its existence, govern the butterfly. The difference is still more remarkable in the transformations undergone by that class of animals which spend the first portion of their life beneath the surface of the waters, and the latter part as inhabitants of air. It is true that the periods during which these laws exist are not, to our senses, enormous, like the mechanical ones above mentioned; but it cannot be doubted that, immeasurably more complex as they are, they were equally foreknown by their Author; and that the first creation of the egg of the moth, or the libellula, involved within its contrivance, as a necessary consequence, the whole of the subsequent transformations of every individual of their respective races.

In turning our views from these simple consequences of the juxta-position of a few wheels, it is impossible not to perceive the parallel reasoning, as applied to the mighty and far more complex phenomena of nature. To call into existence all the variety of vegetable forms, as they become fitted to exist, by the successive adaptations of their parent earth, is undoubtedly a high exertion of creative power. When a rich vegetation has covered the globe, to create animals adapted to that clothing, which, deriving nourishment from its luxuriance, shall gladden the face of nature, is not only a high but a benevolent exertion of creative power. To change, from time to time, after lengthened periods, the races which exist, as altered physical circumstances may render their abode more or less congenial to their habits, by allowing the natural extinction of some races, and by a new creation of others more fitted to supply the place previously abandoned, is still but the exercise of the same benevolent power. To cause an alteration in those physical circumstances—to add to the comforts of the newly created animals—all these acts imply power of the same order, a perpetual and benevolent superintendence, to take advantage of altered circumstances, for the purpose of producing additional happiness.

But, to have *foreseen*, at the creation of matter and of mind, that a period would arrive when matter, assuming its prearranged combinations, would become susceptible of the support of vegetable forms; that these should in due time themselves supply the pabulum of animal existence; that successive races of giant forms or of microscopic beings should at appointed periods necessarily rise into existence, and as inevitably yield to decay; and that decay and death—the lot of each individual existence—should also act with equal power on the races which they constitute; that the extinction of every race should be as certain as the death of each individual; and the advent of new genera be as inevitable as the destruction of their predecessors;—to have foreseen all these changes, and to have provided, by one comprehensive law, for all that should ever occur, either to the races themselves, to the individuals of which they are composed, or to the globe which they inhabit, manifests a degree of power and of knowledge of a far higher order.

The vast cycles in the geological changes that have taken place in the earth's surface, of which we have ample evidence, offer another analogy in nature to those mechanical changes of law from which we have endeavoured to extract a *unit* sufficiently large to serve as an imperfect measure for some of the simplest works of the Creator.

The gradual advance of geology, during the last twenty years, to the dignity of a science, has arisen from the laborious and extensive collection of facts, and from the enlightened spirit in which the inductions founded on those facts have been deduced and discussed. To those who are unacquainted with this science, or indeed to any person not deeply versed in the history of this and kindred subjects, it is impossible to convey a just impression of the nature of that evidence by which a multitude of its conclusions are supported:—evidence in many cases so irresistible, that the records of the past ages, to which it refers, are traced in language more imperishable than that of the historian of any human transactions; the relics of those beings, entombed in the strata which myriads of centuries have heaped upon their graves, giving a present evidence of their past existence, with which no human testimony can compete. It is found that each additional step, in the grouping together of the facts of geology, confirms the view that the changes of our planet, since it has been the abode of man, is but as a page in the massive volumes of its history, every leaf of which, written in the same character, conveys to the decipherer the idea of a succession of the same causes acting with varying intensity, through unequal but enormous periods, each period apparently distinguished by the coming in or going out of new subsidiary laws, yet all submitted to some still higher condition, which has stamped the mark of unity on the series, and points to the conclusion that the minutest changes, as well as those transitions apparently the most abrupt, have throughout all time been the necessary, the inevitable consequences of some more comprehensive law impressed on matter at the dawn of its existence.

(To be continued.)

Prohibited Books.—A copy of the Index Librorum Prohibitorum of Pope Gregory XVI, published at Rome in 1836, has just fallen under our eye, and as a curiosity in its way demands a notice. It has long been a principle of the popes to exclude the books of heretics from their dominions, but we had no idea that they carried their excommunication to the extent indicated by the formidable list before us, which forms an octavo volume of over 400 pages. To give an idea of the books which the good people of Italy, and indeed the catholics generally, are not allowed to peruse, we subjoin a list of a few well known to the English reader:—Milton's Paradise Lost, Barclay's Apology, Robertson's Charles V., Sismondi's Italian Republics, Notre Dame de Paris, Hume's England, Gibbon's Decline and Fall of the Roman Empire, Lady Morgan's *Italy*, Richardson's novel of Pamela, Boyle's Works, the Liturgy of the Church of England, Burnet's History of the Reformation, Hugo Grotius de Jure ac Belli, Swedenborg's Works, Sherlock's Sermons, &c. &c.; altogether it is a list which will astonish every one who has paid no attention to the subject.

The regulations respecting the perusal of the Bible, contained in the rules prefixed, are worthy of translation; they are as follows:—

"Since it has been proven by experience that if Holy Bibles in the common tongue should be permitted every where without distinction, more detriment than utility would arise,—on this subject let it rest with the judgment of the bishop or inquisitor that, with the advice of the priest or confessor, they may grant the perusal of Bibles in the common tongue, in the versions of catholic authors, to those whom they think will receive no injury from such perusal, but an increase of faith and piety: which power they have by these writings.

"But whosoever shall presume, without such power, to read or have them, unless the Bible be first given up to the ordinary, shall not be able to receive absolution for his sins.

"And booksellers who, without having the aforesaid power, shall sell the condemned Bibles in the common tongue, or shall make them over in any way whatsoever, shall lose the price of the books, to be converted by the bishop to pious uses, and shall be liable to other punishments according to the quality of the offence, at the will of the bishop."

Again:—"Ancient writings by heathens, on account of the elegance and propriety of the style, are allowed: nevertheless, on no account are they to be read by boys."

New books cannot be given or loaned without a license, unless it is previously known that the book is notoriously allowed.

The Cruise of the Peacock.—The arrival of the U. S. Ship Peacock, at Norfolk, gives us reason to anticipate the forthcoming of a new and pleasant book from the author of "Two Years in the Pacific," who was fleet surgeon during the long and highly interesting cruise.

The fifth part of the Life of Sir Walter Scott has appeared in London, and in Philadelphia.

Life of Burr.—Vol. II. of the Life of Burr just published, meets the expectations of the public; it is full of historical interest, even more so than the first.

Works of Lamb.—The Messrs. Harpers will publish the Works of Lamb, and Talfourd's Life and Letters. Also an edition of Mr. Pardoe's City of the Sultan.

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* It has been supposed that ten turns of the handle of the calculating engine might be made in a minute, or about five hundred and twenty-six millions in a century. As in this case, each turn would make a calculation, after the lapse of a million of centuries, only the fifteenth place of figures would have been reached.